

the holes so that at least some of the holes can tunnel from the anode through the first interfacial layer to the organic layer, and the second interfacial layer includes electron traps that accumulate a portion of the electrons so that at least some of the electrons can tunnel from the cathode through the second interfacial layer to the organic layer.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 shows a cross-sectional view of an embodiment of an electronic device 205 according to the present invention.

FIGS. 2a-d show energy band diagrams for different configurations of the embodiment of the electronic device according to the present invention.

FIG. 3 shows the bending of the bands of the first configuration of the embodiment of the electronic device according to the present invention.

FIG. 4 shows the bending of the bands of the second configuration of the embodiment of the electronic device according to the present invention.

FIG. 5 shows the bending of the bands of the third configuration of the embodiment of the electronic device according to the present invention.

#### **DETAILED DESCRIPTION**

In an embodiment of the invention, an electronic device includes an interfacial layer with traps. This interfacial layer is between an electrode and an organic layer, and if the electrode was adjacent to the organic layer, the energy barrier between these two layers is such that the current through the organic layer is limited by charge injection into this layer rather than the transport properties of the organic layer. The traps are used to accumulate charges of one charge type (e.g., either electrons or holes) within the interfacial layer. By accumulating charges, the bands of the interfacial layer are bent so that charges can tunnel from the electrode to the organic layer thus increasing the efficiency of the electronic device and allowing organic layers to be used within an electronic device that otherwise would be too inefficient for use in that device.

FIG. 1 shows a cross-sectional view of an embodiment of an electronic device 205 according to the present invention. The electronic device 205 can be any device that injects charges into an active organic layer. Examples of electronic devices are an